Engineering Analysis to Evaluate Flooding Issues

Foxcroft Colony and Mosby Woods Condominiums

March 11, 2015

CITY OF FAIRFAX
1805
VIRGINIA

Introductions

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Meeting Agenda

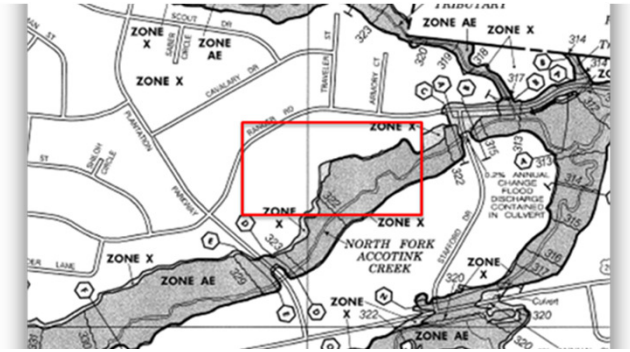
- Project History
  - Project Timeline
  - Impacted Areas
  - History of Flooding
- Project Approach
- Flood Mitigation Options and Constraints
- Next Steps
- Open Discussion

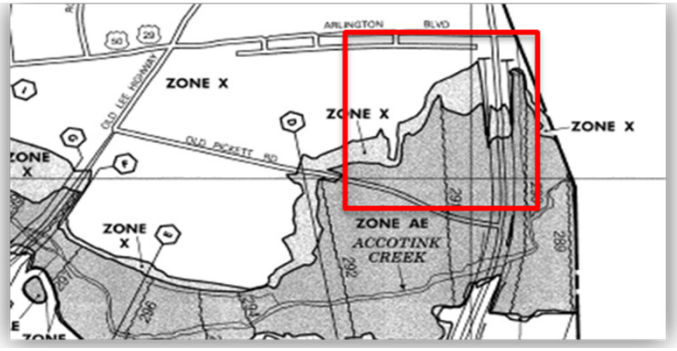
Project History and Timeline

June 2012	• City posted public advertisement for Request for Qualifications for Initial Study to Address Flooding Issues
January 2013	• Consultant started work on the project
February 2013	• Stakeholder Meetings held with Home Owner Association Board of Directors
March 2013	• Initial Feasibility Report to Address Flooding Issues submitted to City by Consultant
April 2013	• Project Work Session with City Council
May 2014	• City allocated additional funds to continue to study to address flooding issues
May 2014 – Present	• Continued study to address flooding issues

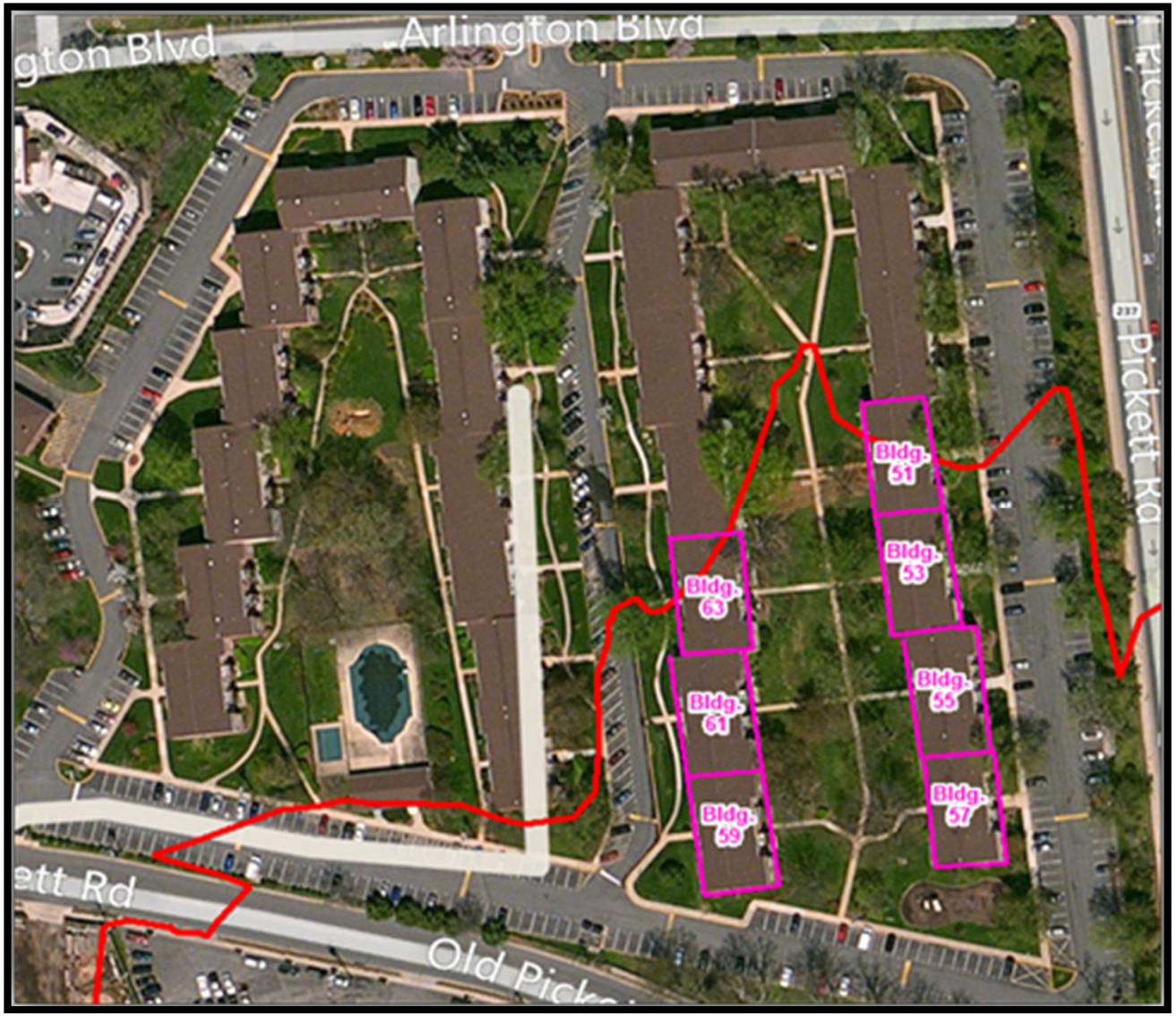
Impacted Areas

- Based on the **FEMA Flood Insurance Rate Maps** (FIRMs) for the City of Fairfax:
  - There are 28 condominium units in 7 buildings at the Foxcroft Colony Condominium complex that are located in the 100-year floodplain and are at risk of future flooding
  - There are 28 condominium units in 7 buildings at the Mosby Woods Condominium complex that are located in the 100-year floodplain and are at risk of future flooding
  - Several commercial properties in the vicinity are also located within the floodplain and affected during large storm events





Impacted Areas – Foxcroft Colony



History of Flooding - Foxcroft Colony Condominiums

BY STEVEN KAPPLER

Flooding at the Foxcroft Condominiums on Arlington Boulevard in Fairfax led to waist-deep standing water and partially submerged a sport-utility vehicle. More than six inches of rain fell in some parts of the Washington region.

Current Conditions	
Identified Problem	Reoccurring flooding
Location	Near Accotink Creek At Pickett Road
Flooding Potential	28 units located in 100-year floodplain
Construction Date	Condos built in 1960s, 312 units
Recent Issues	• September 2011 Tropical Storm Lee - 12 units flooded • September 2008 Hurricane Hanna – 8 units flooded • October 2012 Hurricane Sandy – Property Grounds flooded • Frequent flooding of property grounds and backup of storm sewer from smaller storms

Impacted Areas – Mosby Woods

History of Flooding - Mosby Woods Condominiums

Current Conditions	
Identified Problem	Reoccurring flooding
Location	North Fork Accotink Creek at Plantation Parkway
Flooding Potential	28 units located in 100-year floodplain
Construction Date	Condos built in 1960s
Recent Issues	September 2011 Tropical Storm Lee - 7 units flooded September 2006 Tropical Cyclone – 7 units flooded October 2012 Hurricane Sandy – Property Grounds flooded

Project Approach

- Continue Feasibility Analysis
  - Field Reconnaissance
  - Investigate Potential Alternative Measures
  - Benefit to Cost Analysis
  - Stakeholder Outreach Meetings
- Select Recommendations for Improvements
- Concept Design Plans

Constraints and Considerations

Planning constraints and considerations include:

- **Avoid increasing flooding**, both upstream and downstream of actions taken.
- **Avoid negatively impacting natural features** in the area around the condominiums.
- **Comply with all Federal, State and local regulations**.
- **Total costs** for proposed options and the **Benefit-to-Cost**.
- **Consider the available funding** and grant programs available.

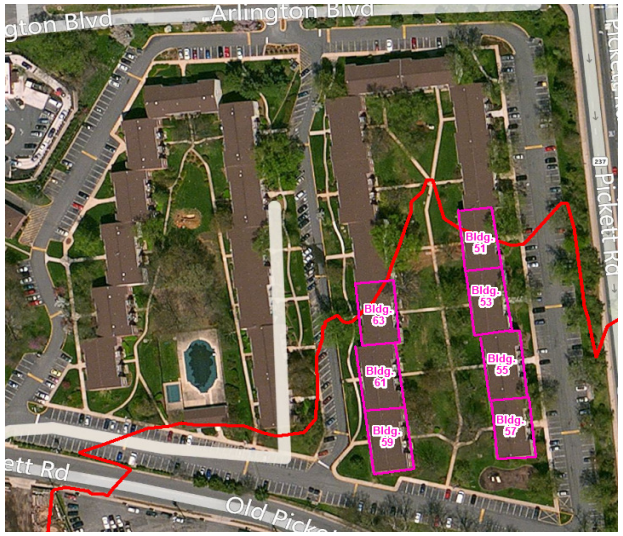
Measures Evaluated for Foxcroft Colony

Alternative Measure / Plan	Alternative Type	Furthered Considered?
Flood-proofing structures in the floodplain	**Non-Structural**	**Yes**
Flood Wall system around a portion of Foxcroft Colony property	**Structural**	**Yes**
Backflow prevention device on stormwater conveyance system and Dredge Accotink Creek to Increase conveyance through Pickett Road Bridge	**Structural – Local Drainage Modification, Increase Conveyance**	**Yes**
Acquisition of (buy and relocate) flood-prone structures	Non-Structural	No
Elevating Structures	Non-Structural	No
Levee system around a portion of Foxcroft Colony property	Structural	No
Adding conveyance under Pickett Road at Foxcroft Colony Condominium property	Increase Conveyance	No
Channelization	Increase Conveyance	No
On-Line Floodplain Storage	Increase Storage	No
Increase the flood storage with a Dam in Accotink Creek floodplain	Increase Storage	No

Foxcroft Colony Condominiums

Alternative Plan 1: Flood-Proofing Foxcroft Colony Condominium Buildings

- Flood proof 7 buildings using impervious membrane and door barriers



Alternative Plan 1 : Flood-Proofing Buildings

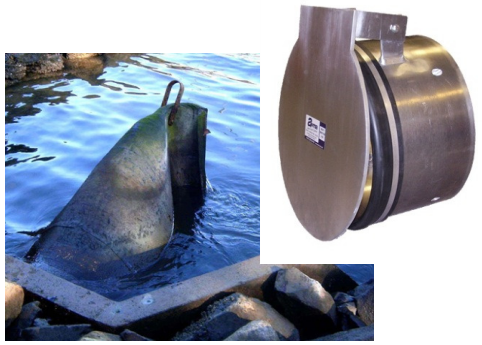
Effectiveness	Moderate
ROM Costs	$388,000
Funding Opportunities	No credit or reduction in flood insurance premiums for flood-proofed residential structures
Implementation	6 months
Advantages	• Less costly than other retrofitting methods • Does not require additional land that may be needed for levees and floodwalls • Easy/quick to construct/install • Low maintenance requirements
Disadvantages	• Requires human intervention and adequate warning to install protective measures • Requires a plan for homeowners to know when to install barriers • Does not protect grounds and surrounding areas outside of building • Flood shield may not be aesthetically pleasing

Foxcroft Colony Condominiums

Alternative Plan 2: Localized Minor Drainage Improvements

- Dredge approximately 600 linear feet of Accotink Creek upstream of Pickett Road bridge to increase conveyance
- Install backflow prevention device south of Old Pickett Road at drainage ditch

Alternative Plan 2 : Minor Drainage Improvements – Dredge and Backflow Prevention	
Effectiveness	• Moderate (small events only) /Low
ROM Costs	• $845,000
Funding Opportunities	• Unlikely to be funded by the FEMA Hazard Mitigation Assistance Grant Program
Implementation	• 2 years (design and construction)
Advantages	• Does not require continuous human intervention during a flood event such as flood-proofing methods • Operation and maintenance requirements are low • Helps protect community grounds from more frequent flood events
Disadvantages	• Does <u>not</u> minimize the potential risk from 10-year and greater flood events • Direct impacts to the environment • Is not as cost-effective as other alternative plans • Dredging may require periodic routine maintenance to keep Creek free from sediment and debris buildup

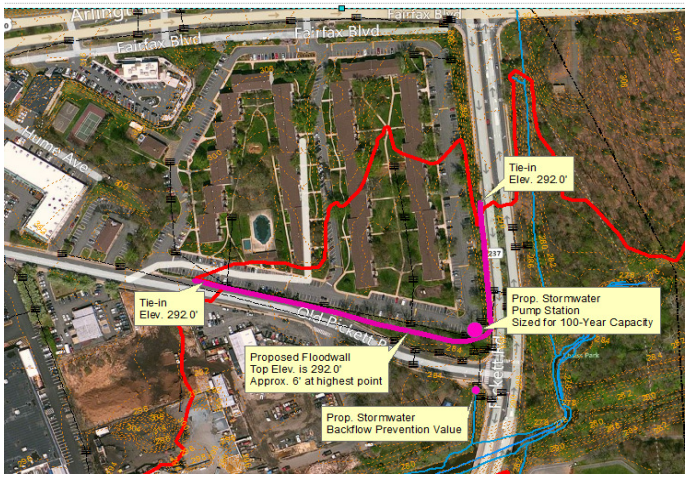


Foxcroft Colony Condominiums

Alternative Plan 3: Install Floodwall at Property Line and Pump Station

- Floodwall along the southern and a portion of the eastern property line of the Foxcroft Colony community
- Pump Station at southeast corner of property to remove interior drainage
- Backflow prevention device on the culvert south of Old Pickett Road

Alternative Plan 3 : Floodwall and Pump Station	
Effectiveness	High
ROM Costs	$3.3 Million
Funding Opportunities	Unlikely to receive Federal funding support
Implementation	3 years (design and construction)
Advantages	• Does not require continuous human intervention during a flood event such as flood-proofing methods • Helps protect community from the 100-year flood event
Disadvantages	• May have direct impacts to the environment • Is costly to construct • Requires periodic routine maintenance and inspections

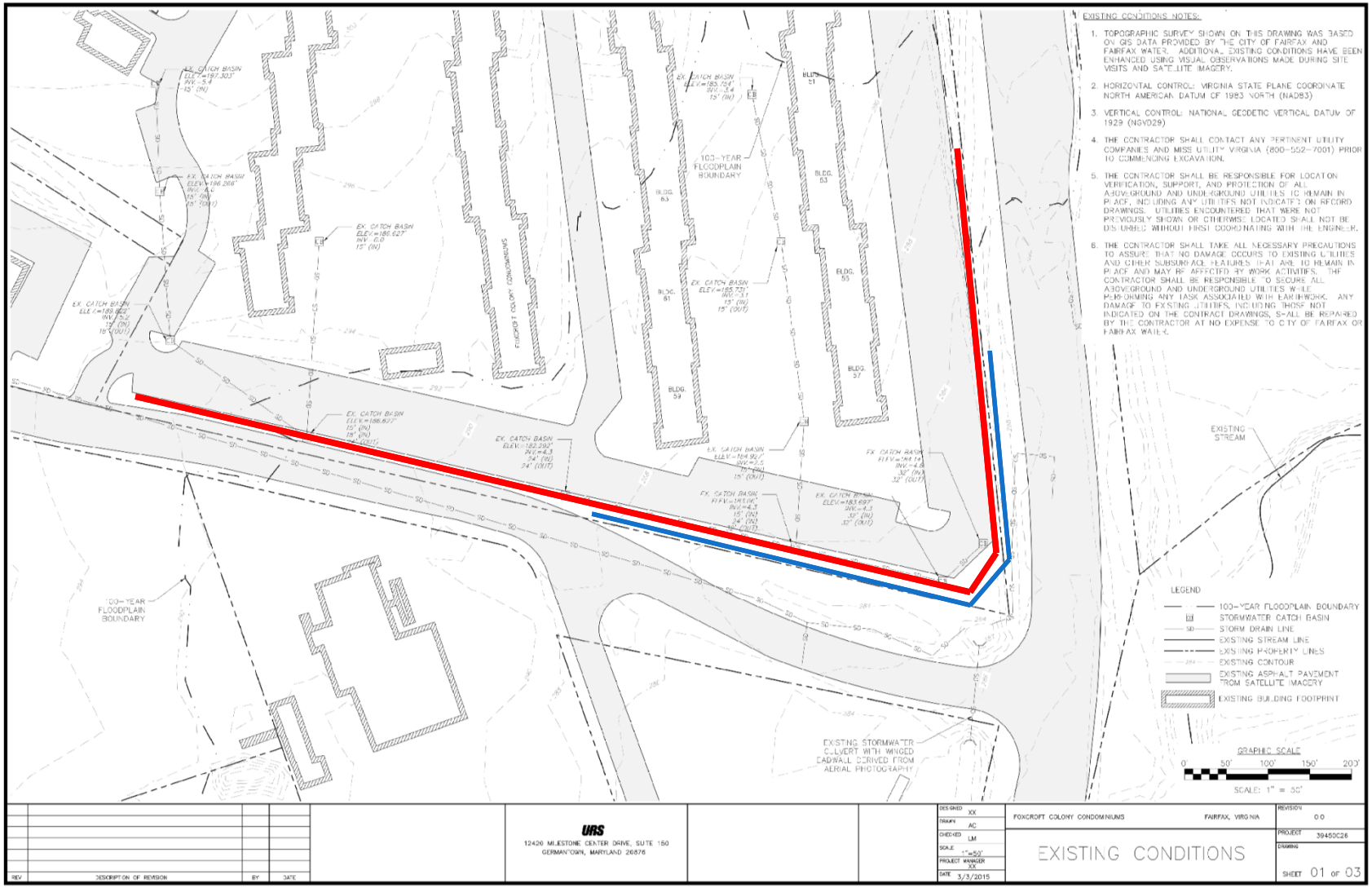


Recommendations moving forward – Foxcroft Colony

Alternative Plan 3: Install Floodwall and Pump Station

- Current Design
  - Designed to meet the 100-year flood elevations
  - Concrete Floodwall in height between 1 ft. - 8 ft.
  - 1 pump station to remove water behind wall
  - FEMA funding is unlikely due to costs vs. benefits
- Refine design to reduce costs
  - Lower design storm level to reduce costs
    - Wall designed for 25-year storm
  - FEMA funding is unlikely due to design level lower than 100-year
  - Additional funding may available

Recommendations moving forward – Foxcroft Colony



Measures Evaluated for Mosby Woods

Alternative Measure / Plan	Alternative Type	Furthered Considered?
Flood-proofing structures in the floodplain	**Non-Structural**	**Yes**
Flood Wall along the North Fork Accotink Creek	**Structural**	**Yes**
Levee/berm along the North Fork Accotink Creek	Structural	No
Acquisition of (buy and relocate) flood-prone structures	Non-Structural	No
Dredge and Stream Restoration of North Fork Accotink Creek	Increase Conveyance	No
Increase conveyance through Stafford Road culvert crossing	Increase Conveyance	No
Increase the on-line flood storage in North Fork Accotink Creek floodplain	Increase Storage	No
Increase the flood storage with a dam in North Fork Accotink Creek floodplain	Increase Storage	No

Mosby Woods Condominiums

Alternative Plan 1: Flood-Proofing Mosby Woods Condominium Buildings

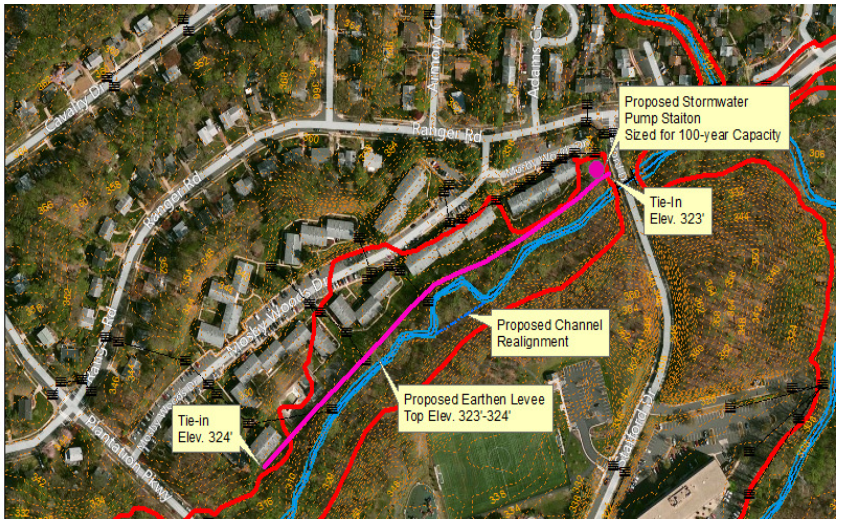
- Flood proof 7 buildings using impervious membrane and door barriers

Alternative Plan 1 : Flood-Proofing Buildings	
Effectiveness	Moderate
ROM Costs	$315,000
Funding Opportunities	No credit or reduction in flood insurance premiums for flood-proofed residential structures
Implementation	6 months
Advantages	• Less costly than other retrofitting methods • Does not require additional land that may be needed for levees and floodwalls • Easy/quick to construct/install • Low maintenance requirements
Disadvantages	• Requires human intervention and adequate warning to install protective measures • Requires a plan for homeowners to know when to install barriers • Does not protect grounds and surrounding areas outside of building • Flood shield may not be aesthetically pleasing

Mosby Woods Condominiums

Alternative Plan 2: Install Floodwall and Pump Station

- Floodwall along the North Fork Accotink Creek
- Pump station at near Stafford Drive to pump interior drainage collected behind levee



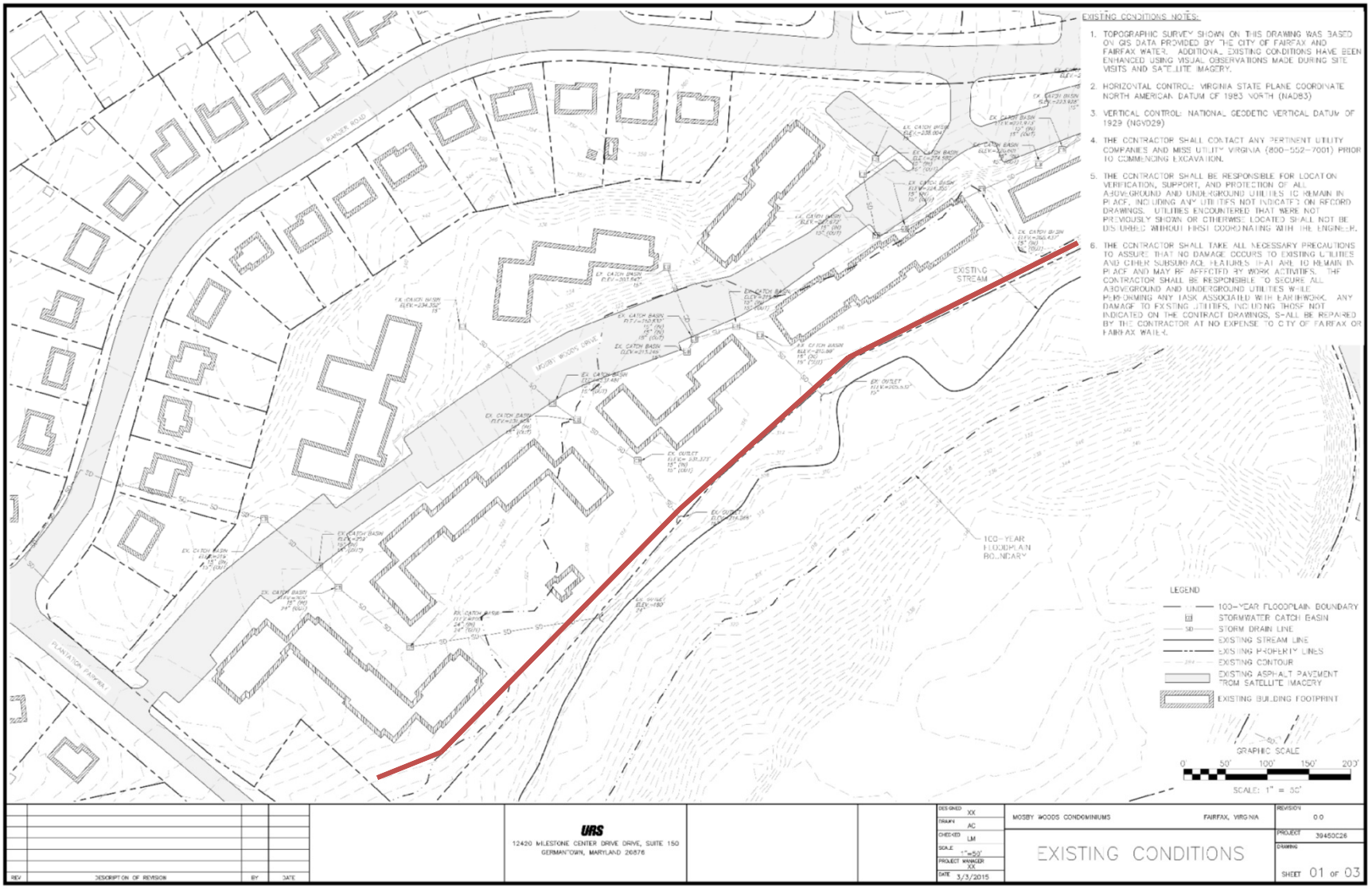
Alternative Plan 2 : Floodwall and Pump Station	
Effectiveness	High
ROM Costs	$4.2 Million
Funding Opportunities	May be funded by the FEMA Hazard Mitigation Assistance Grant Program
Implementation	3 years (design and construction)
Advantages	• Does not require continuous human intervention during a flood event such as flood-proofing methods • Helps protect community from the 100-year flood event
Disadvantages	• May have direct impacts to the environment • Is costly to construct • Takes several years before construction is completed • Requires periodic routine maintenance and inspections

Recommendations moving forward – Mosby Woods

Alternative Plan 2: Install Floodwall and Pump Station

- Current Design
  - Designed to meet the 100-year flood elevations
  - Concrete Floodwall in height between 1 ft. - 12 ft.
  - 3 pump stations to remove water behind wall
- Refine design to reduce costs
  - Lower the cost to meet potential FEMA funding requirements
    - Change design type of wall
    - Reduce number of pump stations

Recommendations moving forward – Mosby Woods



Next Steps…

- Select alternative plan from recommendations
- Design of concept plan and refine cost estimates
- Explore financing options
- Identify grants and funding mechanisms, if available

Questions and Discussion